

Date: Thursday, 26/06/2008 9:12:26 AM
 User: Julie Lecocq

Process Sheet

| | | | |
|------------------------------------|--|---------------------------|--------------------------|
| Customer : | CU-DAR001 Dart Helicopters Services | Drawing Name : | X-TUBE AS 350/355 HI FWD |
| Job Number : | 40099 | Part Number : | D350748141TRN |
| Estimate Number : | 13224 | Drawing Number : | D350-748-141 REV D |
| P.O. Number : | | Project Number : | N/A |
| This Issue : | 26/06/2008 | Drawing Revision : | D |
| Prsht Rev. : | NC | Material : | |
| First Issue : | / / | Due Date : | 07/07/2008 |
| Previous Run : | 40108 | Qty: | 1 Um: Each |
| Written By : | | | |
| Checked & Approved By : | <u>JW 08.6.26</u> | | |
| Comment : | Est Rev:A New Issue 08-03-06 DD verified by:ec Est Rev B Removed polish 08.04.02 EC verified by : DD Est Rev C Remove LPS-3 08.06.23 EC verified by DD | | |

Additional Product

Job Number:



| | | |
|----------------|------------------------------|----------------------|
| Seq. #: | Machine Or Operation: | Description : |
|----------------|------------------------------|----------------------|

| | | |
|-----|----------|--------------------|
| 1.0 | D6017115 | Crosstube Material |
|-----|----------|--------------------|



Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)
 Crosstube Material
 D6017-115
 2.339" OD X 2.000" ID
 Batch: B27471

a.m 08.07.21 ①

| | | |
|-----|------------|----------------------------|
| 2.0 | MORI SEIKI | MORI SEIKI CNC LATHE LARGE |
|-----|------------|----------------------------|

**Comment:** MORI SEIKI CNC LATHE LARGE

1-Fill tube with sand & install plugs on both ends as per Folio FA648

2-Turn first side as per Folio FA648

3- File transition lines smooth.

a.m 08.07.21 ①

| | | |
|-----|-----|------------------------------|
| 3.0 | QC1 | INSPECT ALL DIM TO DIM SHEET |
|-----|-----|------------------------------|

**Comment:** INSPECT ALL DIM TO DIM SHEET

a.m 08.07.21 ①

| | | |
|-----|------------|----------------------------|
| 4.0 | MORI SEIKI | MORI SEIKI CNC LATHE LARGE |
|-----|------------|----------------------------|

**Comment:** MORI SEIKI CNC LATHE LARGE

1-Turn second side as per Folio FA648

2- File transition lines smooth.

a.m 08.07.21 ①

| W/O: | | WORK ORDER CHANGES | | | | | |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE | By | Date | Qty | Approval Chief Eng / Prod Mgr | Approval QC Inspector |
| | | | | | | | |
| | | | | | | | |

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

| NCR: | | WORK ORDER NON-CONFORMANCE (NCR) | | | | | | |
|------|------|----------------------------------|-----------------------------|---------------------------------|----------------|---------------------------|-----------------------|--------------------------|
| DATE | STEP | Description of NC Section A | Corrective Action Section B | | | Verification Section C | Approval Chief Eng | Approval QC Inspector |
| | | | Initial Chief Eng | Action Description Chief Eng | Sign & Date | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

NOTE: Date & initial all entries

Date: Thursday, 26/06/2008 9:12:26 AM
User: Julie Lecocq

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: X-TUBE AS 350/355 HI FWD

Job Number: 40099

Part Number: D350748141TRN

Job Number:



Seq. #:

Machine Or Operation:

Description :

3-Scribe Part & Batch as per Dwg D350-748-141

am 08.07.21

5.0

QC1

INSPECT ALL DIM TO DIM SHEET



Comment: INSPECT ALL DIM TO DIM SHEET

am 08.07.21

6.0

QC8

SECOND CHECK



AWM 8-7-21



Comment: SECOND CHECK

7.0

OUTSIDE SERV.10

OUTSIDE SERVICES -skids



Comment: Sub-Contracting OUTSIDE SERVICES

Issue P/O: *7012*

Heat Treat to min 180 KSI As per Dwg D350-748-141

(MIL-T-6736 OR AMS 2759-1C)

Sand Blast tube after Heat Treat

Possible Supplier: Vac Aero

Ensure Certificate of Conformity is attached

CL08/08/25
①

8.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Receive & Inspect For Transit Damage

Ensure certificate of conformity is attached

P 8/9/21

9.0

QC6

DIMENSIONAL CHECK



Comment: DIMENSIONAL CHECK

502/09/30

10.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Oil inside of tube with LPS-3.

A/R LPS-3 Batch: _____

N/A

11.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Identify and stock in kanban rack

Location: *back hall*

RT 08-09-30

Dart Aerospace Ltd

| W/O: | | WORK ORDER CHANGES | | | | | |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE | By | Date | Qty | Approval Chief Eng / Prod Mgr | Approval QC Inspector |
| | | | | | | | |
| | | | | | | | |

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

| NCR: | | WORK ORDER NON-CONFORMANCE (NCR) | | | | | | |
|------|------|----------------------------------|-----------------------------|---------------------------------|----------------|---------------------------|-----------------------|--------------------------|
| DATE | STEP | Description of NC Section A | Corrective Action Section B | | | Verification Section C | Approval Chief Eng | Approval QC Inspector |
| | | | Initial Chief Eng | Action Description Chief Eng | Sign & Date | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

NOTE: Date & initial all entries

Date: Thursday, 26/06/2008 9:12:26 AM
User: Julie Lecocq

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: X-TUBE AS 350/355 HI FWD

Job Number: 40099

Part Number: D350748141TRN

Job Number:



Seq. #:

Machine Or Operation:

Description :

12.0

QC21

FINAL INSPECTION/W/O RELEASE



08/09/30 JF

Comment: FINAL INSPECTION/W/O RELEASE

Job Completion



MF 08-09-30

Dart Aerospace Ltd

| W/O: | | WORK ORDER CHANGES | | | | | |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE | By | Date | Qty | Approval Chief Eng / Prod Mgr | Approval QC Inspector |
| | | | | | | | |
| | | | | | | | |

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

| NCR: | | WORK ORDER NON-CONFORMANCE (NCR) | | | | | | |
|------|------|----------------------------------|-----------------------------|---------------------------------|----------------|---------------------------|-----------------------|--------------------------|
| DATE | STEP | Description of NC Section A | Corrective Action Section B | | | Verification Section C | Approval Chief Eng | Approval QC Inspector |
| | | | Initial Chief Eng | Action Description Chief Eng | Sign & Date | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

NOTE: Date & initial all entries

| | | |
|---|--|----------------------------------|
| DART AEROSPACE LTD | | Work Order: 40099 |
| Description: Crosstube Assembly (AS350/355 High Fwd) | | Part Number: D350-748-141 |
| Inspection Dwg: D350-748-141 Rev: D | | Page 1 of 1 |

FIRST ARTICLE INSPECTION CHECKLIST

☒ First Article ☐ Prototype

| Inspection Sheet | Drawing Dimension | Tolerance | Actual Dimension | Accept | Reject | Method of Inspection | Comments |
|------------------|-------------------|---------------|------------------|--------|--------|----------------------|----------|
| SIDE A | 2.240 | +0.005/-0.000 | 2.245 | / | | | |
| | 2.180 | +0.005/-0.000 | 2.185 | / | | | |
| | 2.180 | +0.005/-0.000 | 2.195 | / | | | |
| | 2.237 | +0.005/-0.000 | 2.242 | / | | | |
| | 2.272 | +0.005/-0.000 | 2.277 | / | | | |
| | 2.306 | +0.005/-0.000 | 2.311 | / | | | |
| | 2.339 | +0.005/-0.000 | 2.343 | / | | | |
| | 2.339 | +0.005/-0.000 | 2.343 | / | | | |
| | | | | | | | |
| | 0.062 | +/-0.010 | 0.062 | / | | | |
| | 4.26 | +/-0.030 | 4.260 | / | | | |
| | R0.063 | +/-0.010 | R0.063 | / | | | |
| | R0.50 | +/-0.030 | R0.500 | / | | | |
| | | | | | | | |
| SIDE B | 2.240 | +0.005/-0.000 | 2.245 | / | | | |
| | 2.180 | +0.005/-0.000 | 2.185 | / | | | |
| | 2.180 | +0.005/-0.000 | 2.185 | / | | | |
| | 2.237 | +0.005/-0.000 | 2.242 | / | | | |
| | 2.272 | +0.005/-0.000 | 2.277 | / | | | |
| | 2.306 | +0.005/-0.000 | 2.311 | / | | | |
| | 2.339 | +0.005/-0.000 | 2.343 | / | | | |
| | 2.339 | +0.005/-0.000 | 2.343 | / | | | |
| | | | | | | | |
| | 0.062 | +/-0.010 | 0.062 | / | | | |
| | 4.26 | +/-0.030 | 4.260 | / | | | |
| | R0.063 | +/-0.010 | R0.063 | / | | | |
| | R0.50 | +/-0.030 | R0.500 | / | | | |
| | | | | | | | |
| | 110.27 | +/-0.060 | 110.310 | / | | | |

| | | | |
|-------------------------|------------------------|----------------------------|-----|
| Measured by: a.m | Audited by: AWM | Prototype Approval: | N/A |
| Date: 08.07.21 | Date: 8-7-21 | Date: | N/A |

| Rev | Date | Change | Revised by | Approved |
|-----|----------|------------------------------|------------|----------|
| A | 06.11.09 | New Issue (P/O D350-748-101) | KJ/JLM | |
| B | 07.10.24 | Dwg Rev updated | KJ/EC/DD | |

DART**RELEASED**

06.10.31

| | | | |
|----------------------|-----------------------|--|------------------------|
| DESIGN <i>QP</i> | DRAWN BY <i>QP</i> | DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA | |
| CHECKED <i>JP</i> | APPROVED <i>JP</i> | DRAWING NO. D350-748-141 | REV. D SHEET 1 OF 3 |
| DATE 06.10.31 | | TITLE CROSSTUBE (AS 350/355 HI FWD) | SCALE NTS |
| A | 06.03.31 | NEW ISSUE | |
| B | 06.06.30 | ADD D6017-115 & PRIME AND PAINT | |
| C | 06.08.14 | ADD CAD PLATING | |
| D | 06.10.31 | MAG. PARTICLE AND CAD PLATE AS MFD. | |

| QTY | P/N | DESCRIPTION |
|-----|---------------|--|
| X | D350-748-141 | CROSSTUBE ASSEMBLY (AS 350/355 HI FWD) |
| 1 | D6017-115 | CROSSTUBE (OR D6015-125) |
| 2 | D3502-1 | SUPPORT |
| 2 | D2856-400-710 | ABRASION STRIP |
| 1 | AELS-1032-225 | INSERT |
| 1 | AN960JD10 | WASHER |
| 2 | MS21920-20 | CLAMP (PER DART SPEC. M-MS21920-20) |
| 1 | MS27039-1-10 | SCREW |

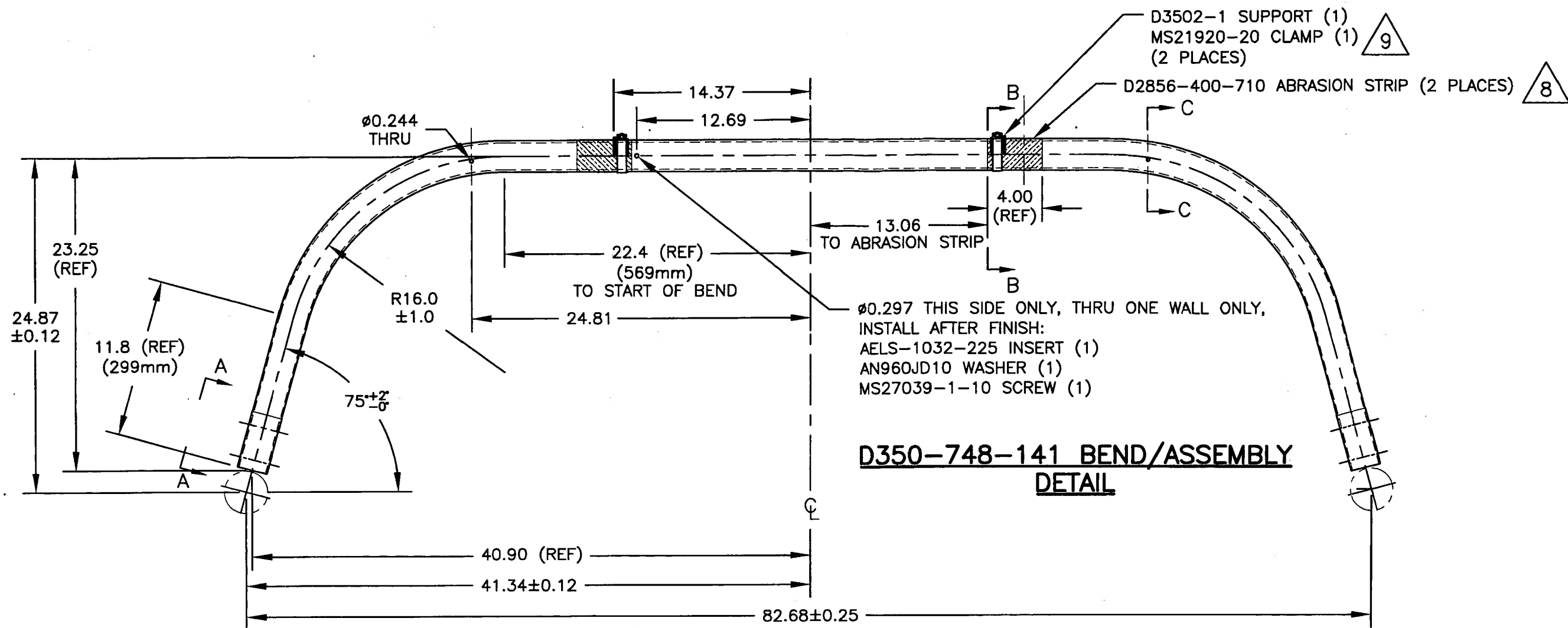
D350-748-141 CROSSTUBE:

- 1) MATERIAL: MANUFACTURED FROM D6017-115 OR D6015-125
FINISHED LENGTH = 110.27±0.06
- 2) MACHINE PER MACHINING DETAIL ON PAGE 3. BLEND OUT ALL EDGES FROM MACHINING LONGITUDINALLY, TRANSITIONS SHOULD BE SMOOTH. NOTE: ALL HOLES ARE DRILLED AFTER BENDING.
- 3) SCRIBE DART PART NUMBER AND BATCH NUMBER IN THIS AREA WITH VIBRATING STYLUS.
- 4) BEND PROGRESSIVELY WITH A MINIMUM OF 7 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 5) HEAT TREAT TO MIN. 180 KSI PER MIL-T-6736 OR AMS 2759-1C AFTER TURNING
- 6) FINISH: MAGNETIC PARTICLE INSPECT PER DART QSI 038 4.2
CADMIUM PLATE PER AMS-QQ-P-416B, CLASS 1, TYPE II
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 7) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. WHEN DRILLING HOLES EXTREME CARE MUST BE TAKEN AND CAREFUL DEBURRING PERFORMED TO ENSURE A CLEAN HOLE WITH NO CRACKING/CHIPPING/GROOVES.
- 8) INSTALL D2856-400-710 ABRASION STRIP WITH A GAP ON BOTTOM SIDE OF CROSSTUBE, CENTERED OPPOSITE D3502-1 SUPPORT, PER QSI 035.
- 9) TORQUE MS21920-20 CLAMPS 60 TO 80 IN-LB
- 10) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 11) ALL DIMENSIONS ARE IN INCHES
- 12) PART IS SYMMETRIC ABOUT CENTERLINE EXCEPT FOR Ø0.297 HOLE.

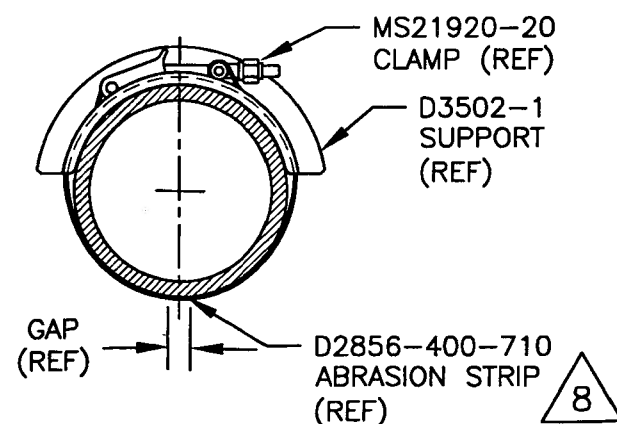
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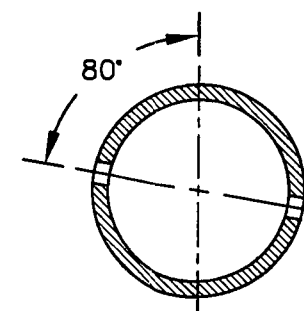
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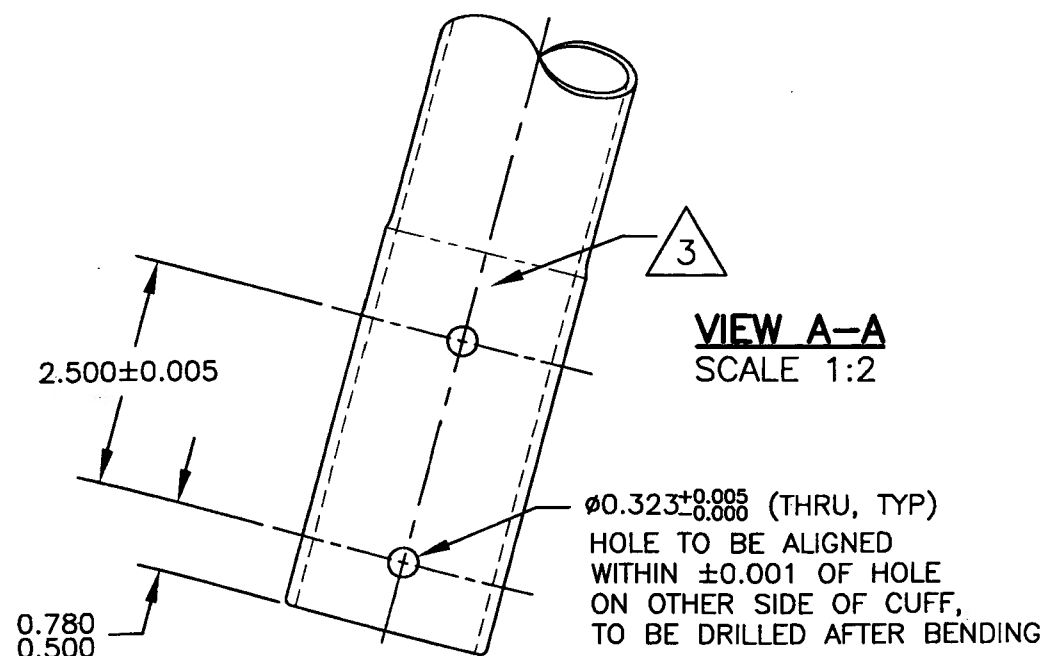
SECTION B-B
SCALE 1:2



SECTION C-C
SCALE 1:2



VIEW A-A
SCALE 1:2



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07.02/16/11
CUFF BEING REDUCED
06.07.11.22

RELEASED
06.10.31/11

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DESIGN

q

DRAWN BY

q

DART

DART AEROSPACE LTD.
HAWKESBURY, ONTARIO, CANADA

CHECKED

#

APPROVED

#

DRAWING NO.
D350-748-141

REV. D

SHEET 2 OF 3

DATE

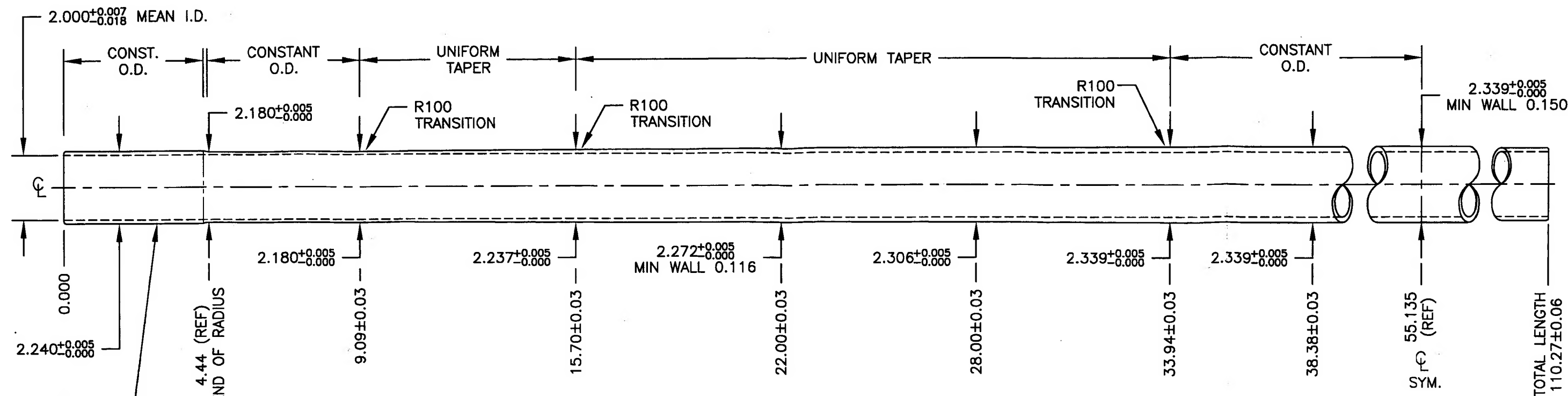
06.10.31

TITLE

CROSSTUBE (AS 350/355 HI FWD)

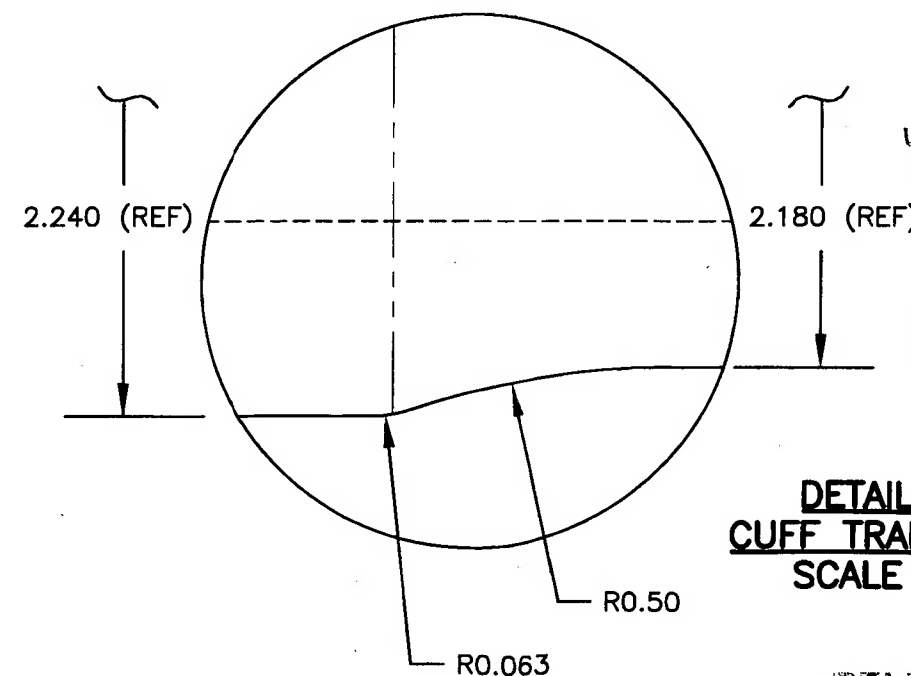
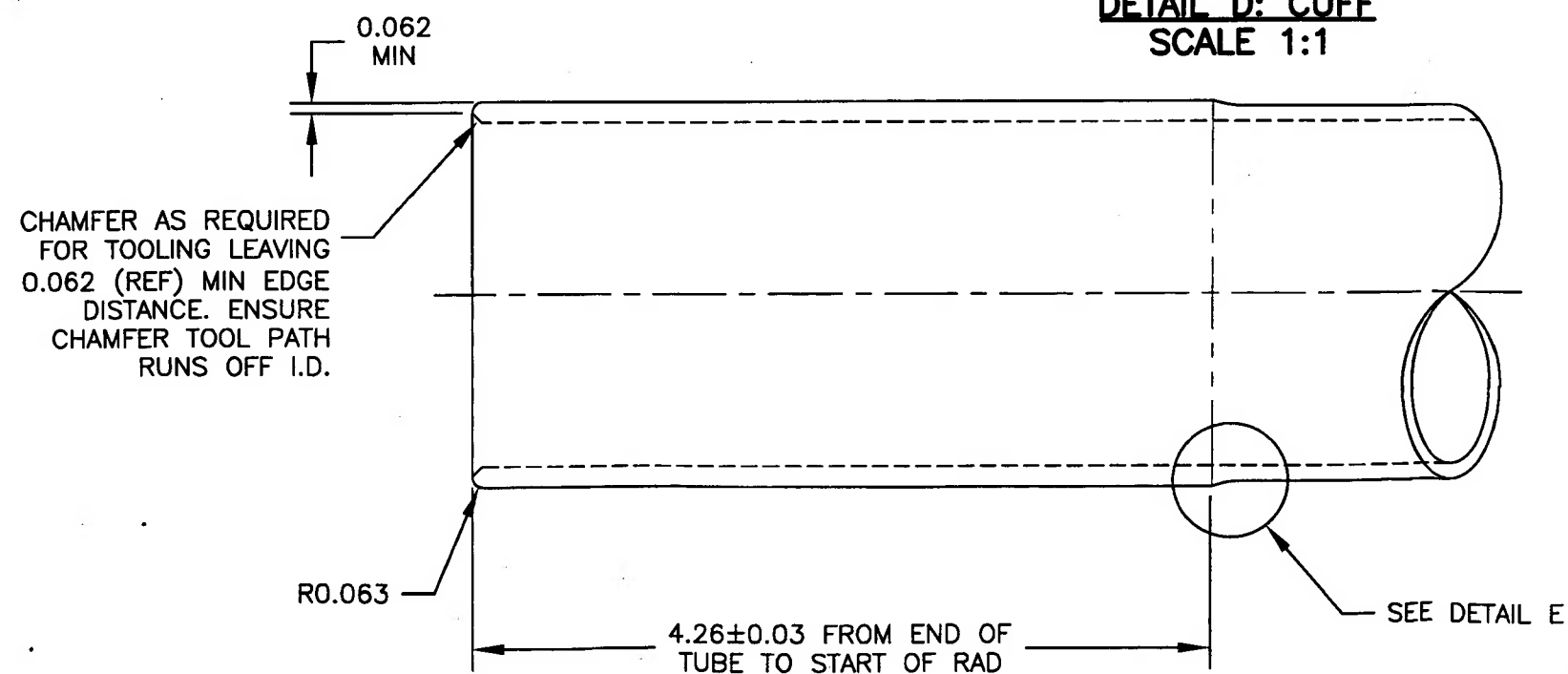
SCALE

1:8



D350-748-141 MACHINING DETAIL

DETAIL D: CUFF SCALE 1:1



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DETAIL E: CUFF TRANSITION SCALE 9:1

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06.10.31

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| | | | |
|------------------|--|-----------------------------|--|
| DESIGN qp | DRAWN BY qp | DART | DART AEROSPACE LTD. HAWKESBURY, ONTARIO, CANADA |
| CHECKED # | APPROVED # | DRAWING NO. D350-748-141 | REV. D SHEET 3 OF 3 |
| DATE 06.10.31 | TITLE CROSSTUBE (AS 350/355 HI FWD) | SCALE 1:3 | |



VAC AERO
INTERNATIONAL INC.

RELEASE NOTE

GST No. : R105468102

OAK 102442-1



HEAD OFFICE
1371 SPEERS ROAD, OAKVILLE, ONTARIO
CANADA L6L 2X5
TEL: (905) 827-4171 FAX: (905) 827-7489



2009 WYECROFT ROAD, UNIT B
OAKVILLE, ONTARIO
CANADA L6L 6J4
TEL: (905) 827-7377 FAX: (905) 827-1380



QUEBEC DIVISION
7450 RUE VÉRITÉ STREET, ST. LAURENT, QUÉBEC
CANADA H4S 1C5
TEL: (514) 334-4240 FAX: (514) 334-6269

09/26/2008

MM / DD / YYYY

PAGE : 1

BILL TO: 1DAR01
DART AEROSPACE LTD.
1270 ABERDEEN ST.
HAWKESBURY, ON

SHIP TO: DART AEROSPACE LTD.
1270 ABERDEEN ST.
HAWKESBURY, ON

K6A 1K7

K6A 1K7

| DATE SHIPPED | SHIP VIA | F.O.B. |
|------------------|----------|-------------|
| 09/26/2008 | | ORIGIN |
| CUSTOMER P/O No. | JOB No. | TERMS |
| 00007012 | | NET 30 DAYS |

| PART No. | DESCRIPTION | UOM | QTY ORD | QTY SHPD | TEST RESULTS |
|----------|-------------|-----|------------|-------------|--------------|
|----------|-------------|-----|------------|-------------|--------------|

D350 748

EA 12 12

Process Specifications: Procedure: 4353
HEAT TREATED TO 180 KSI MIN. PER AMS 2759-1D
100% HARDNESS TESTED AS PER ASTM E-18, 40-45 HRC
MATERIAL: 4130

SAND BLASTED PARTS

1 PIECE P/N D350-748-141 B4010
1 PIECE P/N D350-748-141 B4010
1 PIECE P/N D350-748-141 B4042
1 PIECE P/N D350-748-141 B4009
1 PIECE P/N D350-748-241 B4011
1 PIECE P/N D350-748-241 B4011
1 PIECE P/N D350-748-241 B4041
1 PIECE P/N D350-748-241 B4011
4 PIECES P/N D350-748-141 B0023

100% HARDNESS TESTED

12 PCS

42/43 HRC

S
08/08/30



I hereby certify that the material covered by this release note has been inspected and tested and conforms to all specifications relevant thereto in accordance with the conditions of the contract / or purchase order.

ON BEHALF OF VAC AERO INTERNATIONAL INC.

Anna Robinson
Authorized Q.C. Inspector



VACUUM BRAZING - HEAT TREATING - SPECIAL PROCESSING - FURNACE EQUIPMENT
TURBINE COMPONENT OVERHAUL - PLASMA AND OTHER COATINGS



HEAT
TREATING